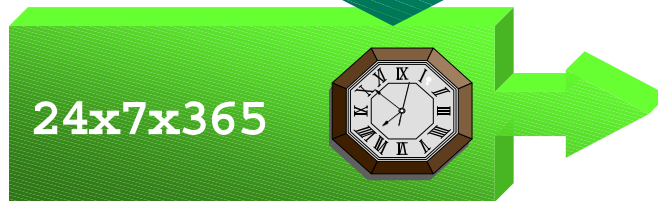# High Availability Clustering with SANs
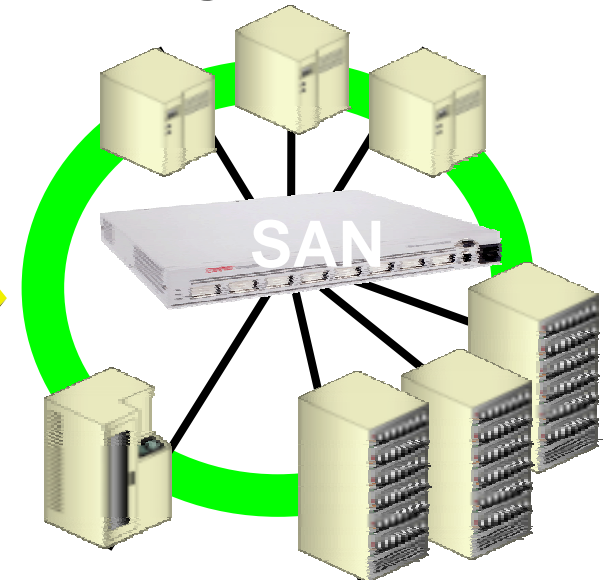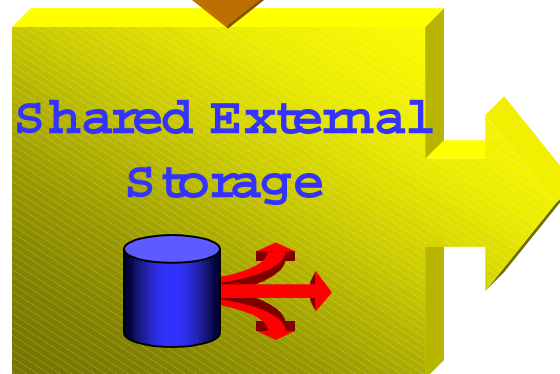
Spencer Sells
Product Marketing Manager
Gadzoox Networks
5850 Hellyer Avenue
San Jose, CA 95124

Increasing Need for High Availability

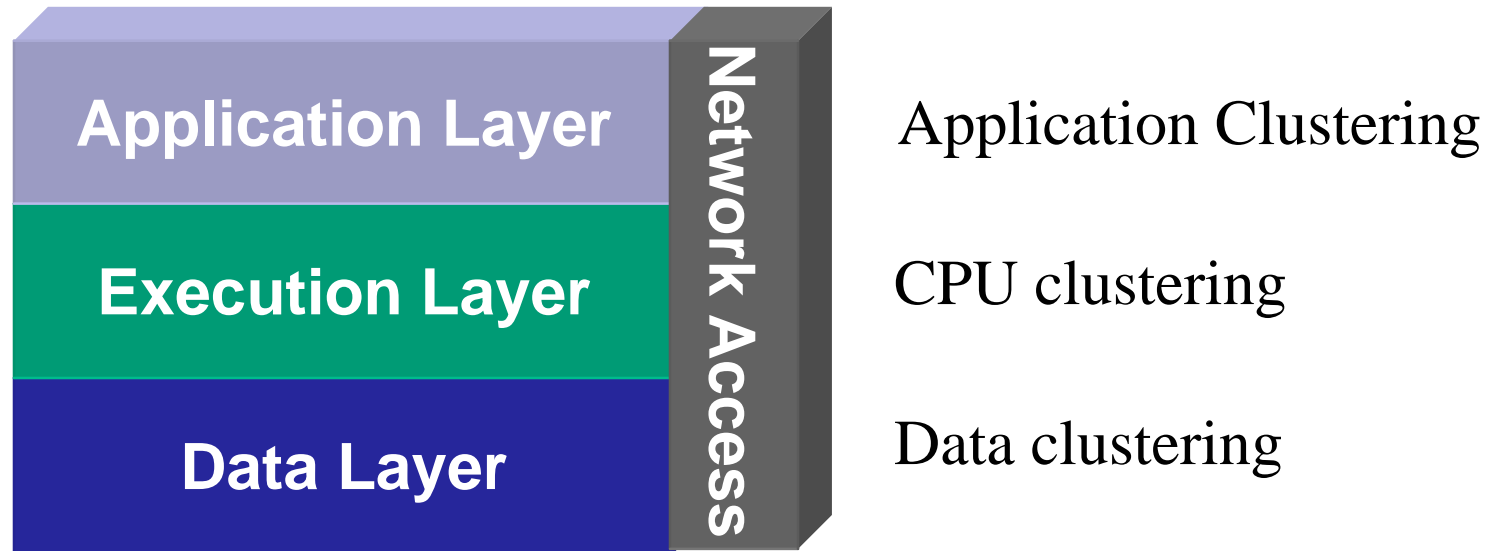**eBusiness Globalization**

24x7x365

High Availability Systems

Can not afford to lose access to data due to a server failure or to process a backup

Shared External Storage

Today's Business Needs Drive the SAN Paradigm Shift

SAN

What is Clustering?

Application Layer	Application Clustering
Execution Layer	CPU clustering
Data Layer	Data clustering

Network Access

These Three Things are Distinctly Different!

Current Interconnect Configuration

3 Networks

CPU **CPU** **CPU** **CPU**

Host Bus

Memory **Memory Controller** **IO Bridge**

Host

IO Bus

HBA HBA NIC

…and application clustering lives here.

Compute clustering lives here...

Cluster Network

Data Clustering lives here…

SAN

LAN
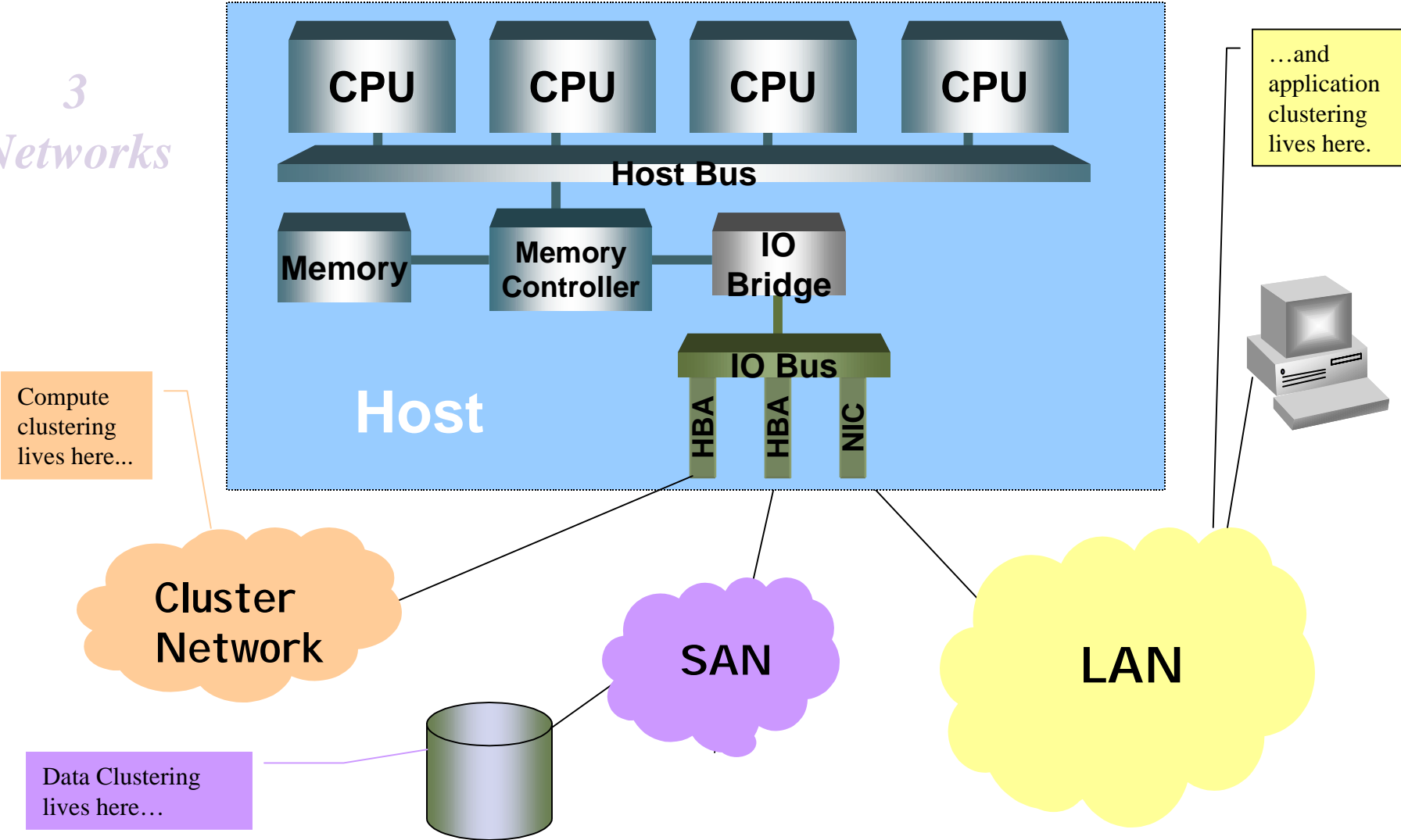
Clustering Benefits

- Availability
  - Redundant components increase availability
    - Rapid failover and restart
- Shared Resources
  - Storage and Tape
- Manageability
  - Consolidate into a single system
- Scalability
  - Add capacity as needed
   - Storage, bandwidth and processing

Clustering in the x86 Market

- Today, more than 60 percent of critical data is deployed on independent workgroup servers

- Microsoft encourages clustering for File/print servers, Database/messaging, and E-commerce sites

- New advances in clustering for Windows (MSFT & 3rd parties)

- "Clustering increasingly important as organizations use high-volume/low-cost systems to handle important workloads" (IDC)

- 100% increase in clustering SW '98 to '99, and similar growth predicted in next few years (IDC)

- SCSI does not cluster well

Clusters and SAN

- IS organizations face an increasing need for high availability
  - More applications becoming business critical
  - e-commerce increases cost of downtime (ESG)
- 100% increase in clustering SW '98 to '99, and similar growth predicted in next few years (IDC)
- SCSI does not cluster well
- Vast majority of SANs are implemented as small SAN islands

# Data Continues to Grow at an Incredible Rate

Petabytes Shipped

Enterprise
Departmental
Personal
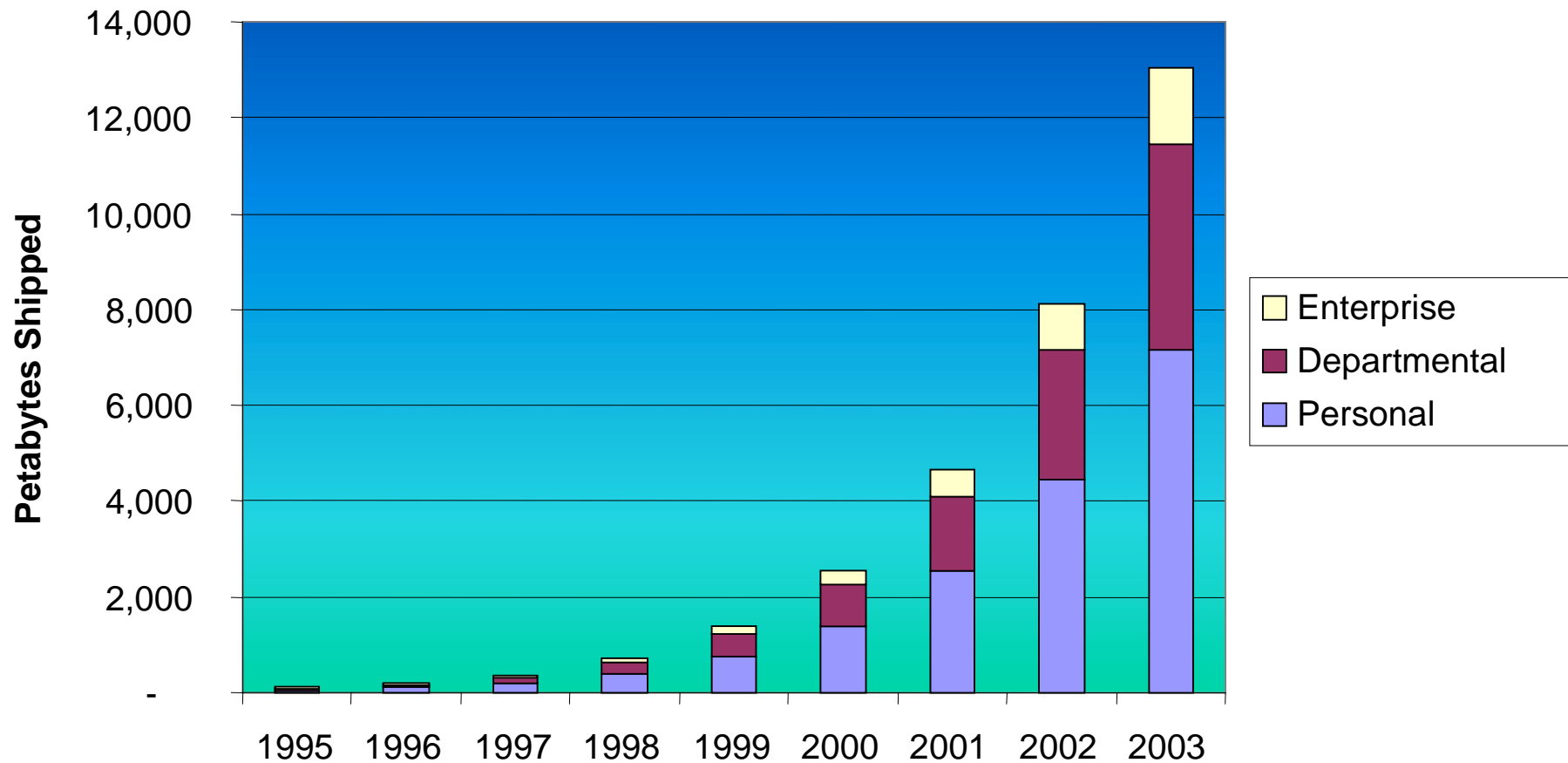
Source: UC Berkeley, School of Information Management and Systems, "How Much Information?", Oct 2000
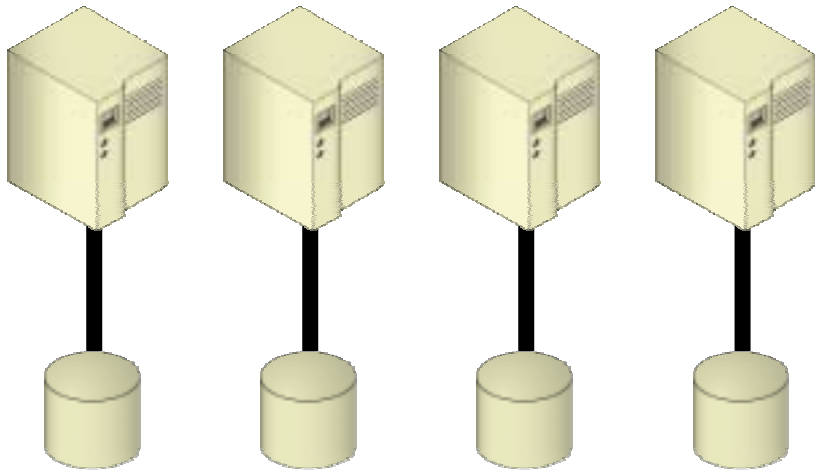
Scaling in Direct Attach Storage Causes Problems

Can result in adding more servers when only need additional storage capacity or adding more storage when only need additional processing power
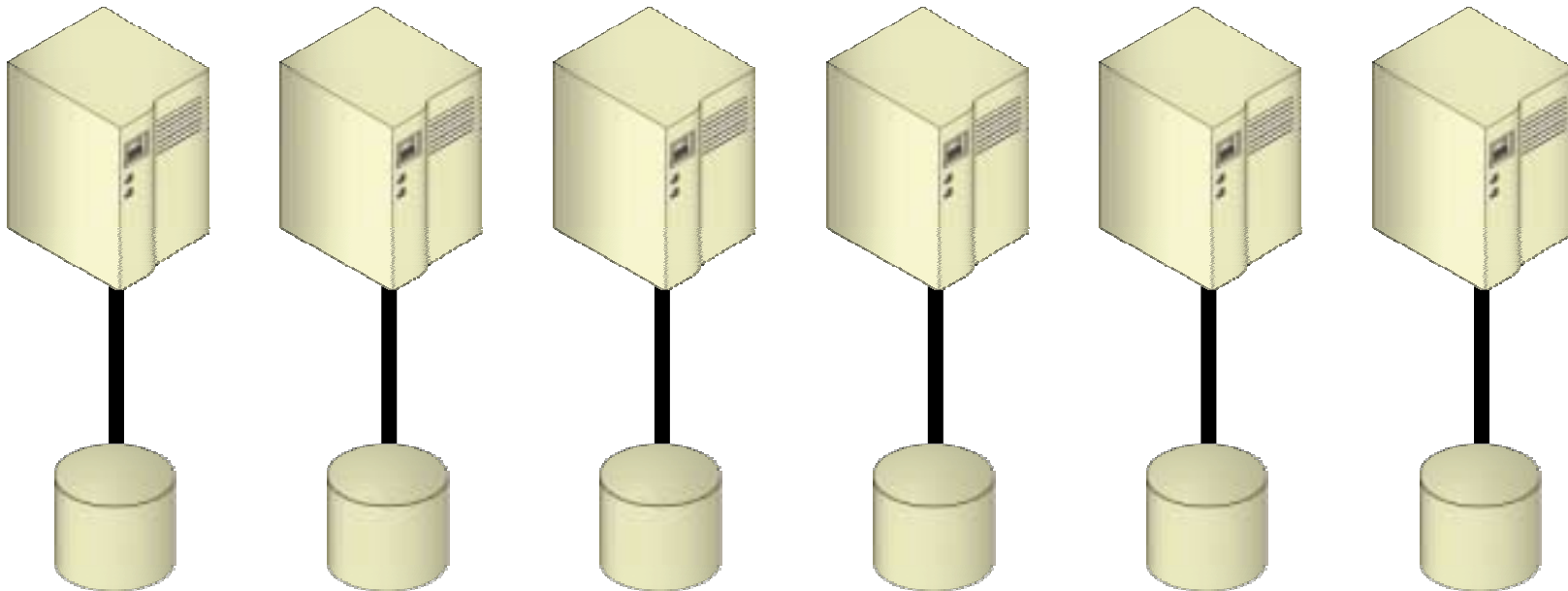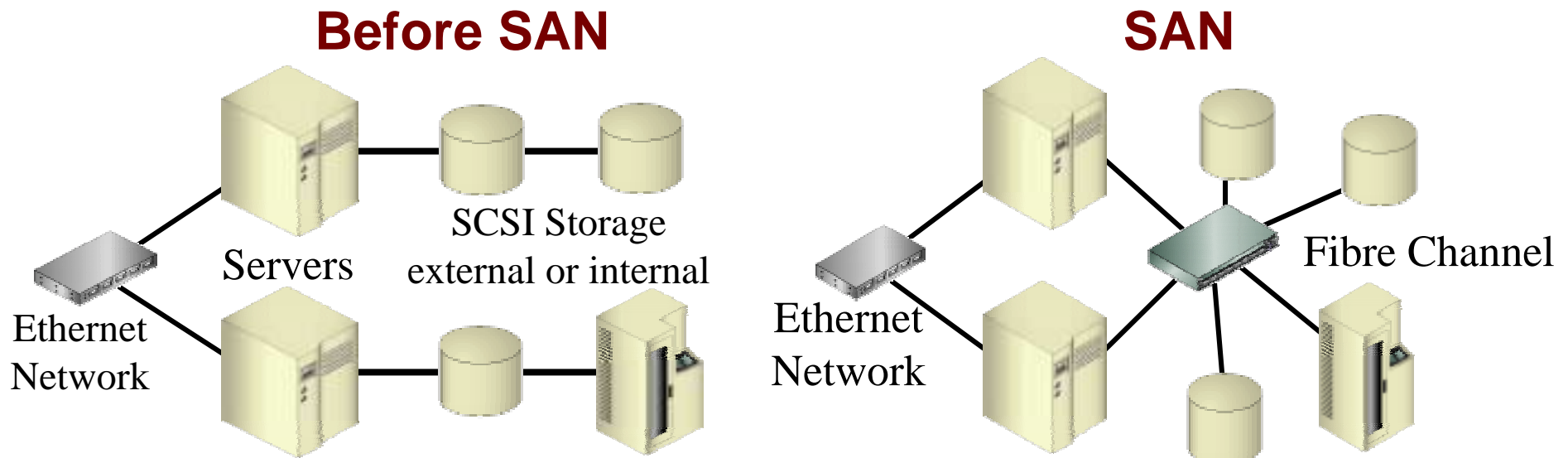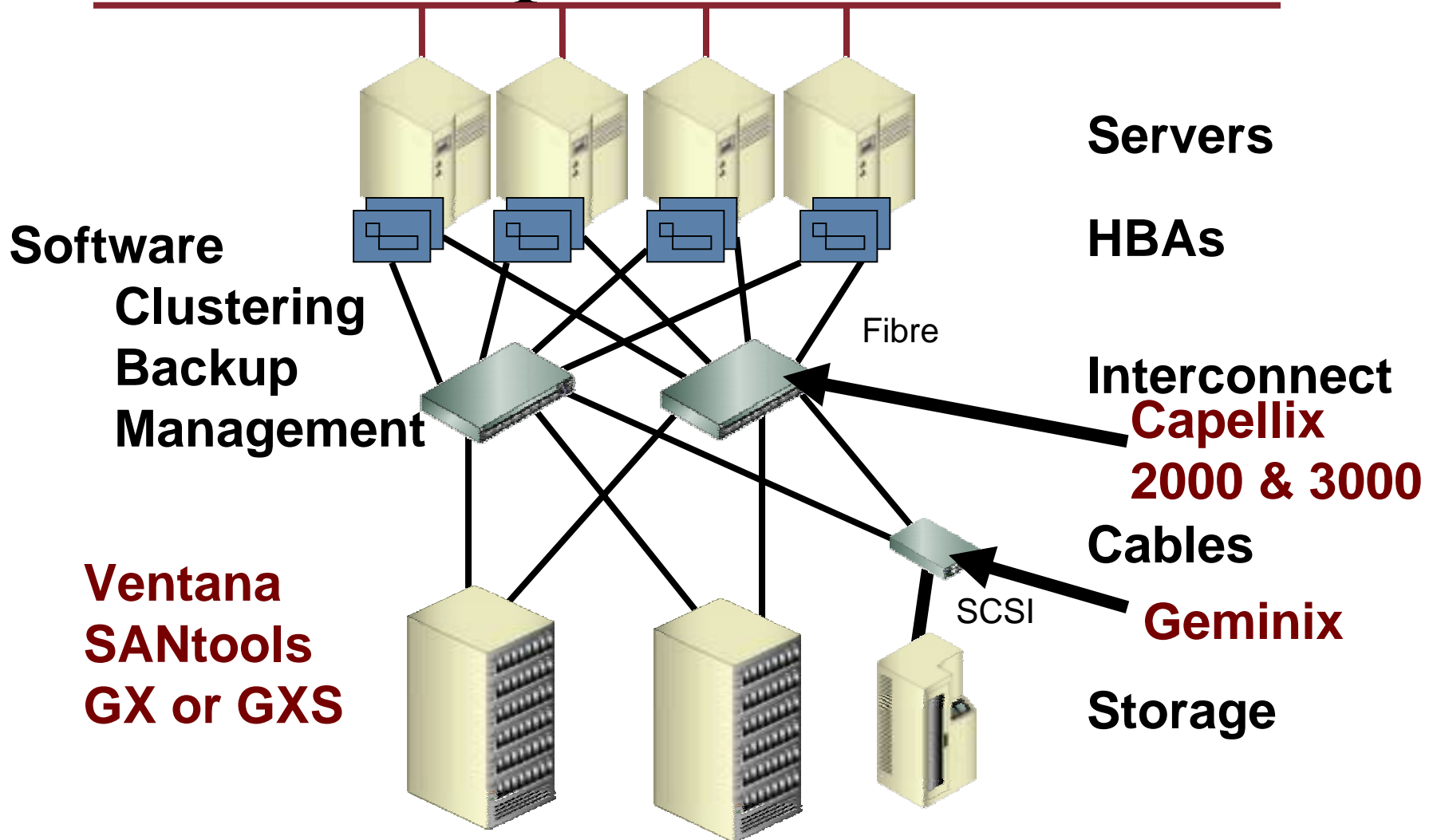
Problems with DAS

- Difficult to manage
- Hard to keep data available
- Hard to backup the data
- Inefficient & EXPENSIVE!

What is a Storage Area Network?

- SAN: A specialized, high-speed network connecting servers and storage devices that is separate from the enterprise communication network.
  - End direct coupling of server and storage
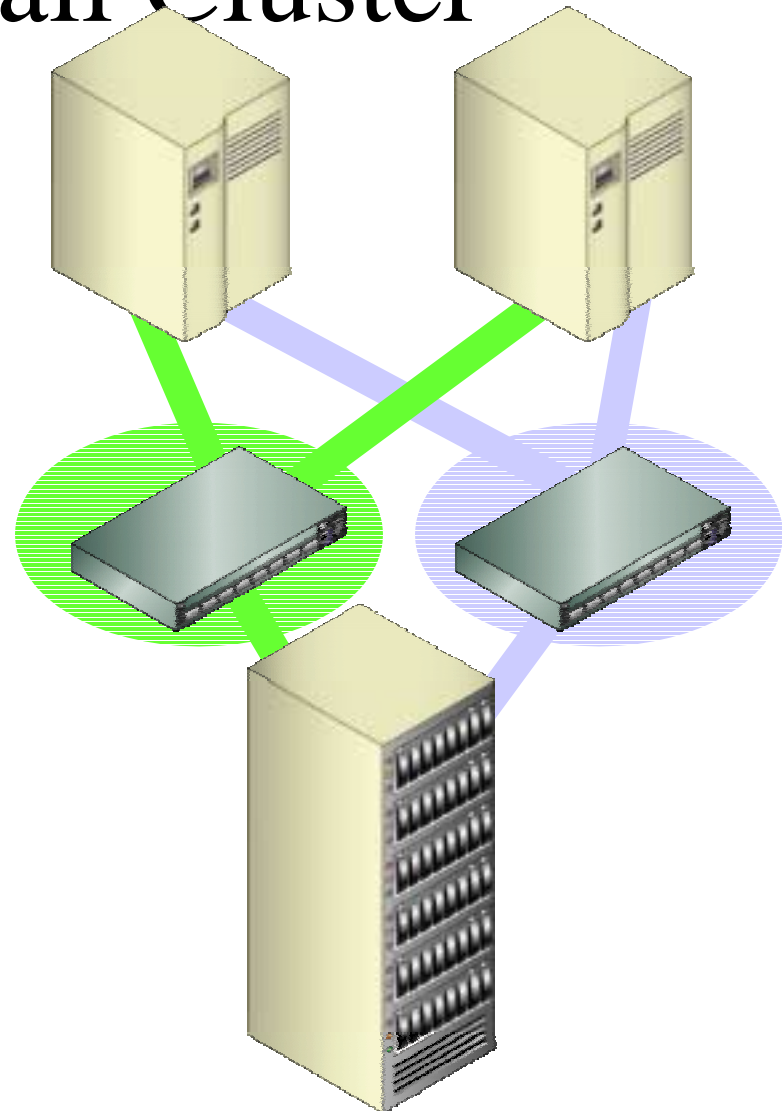 - Today use Fibre Channel technology to move SCSI commands rather than a SCSI bus

Before SAN   **SAN**

Servers

SCSI Storage external or internal

Ethernet Network

Fibre Channel

Ethernet Network

Components of a SAN

Servers

HBAs

Software
   Clustering
   Backup
   Management

Fibre

Interconnect
   Capellix
   2000 & 3000

Cables

Ventana
SANtools
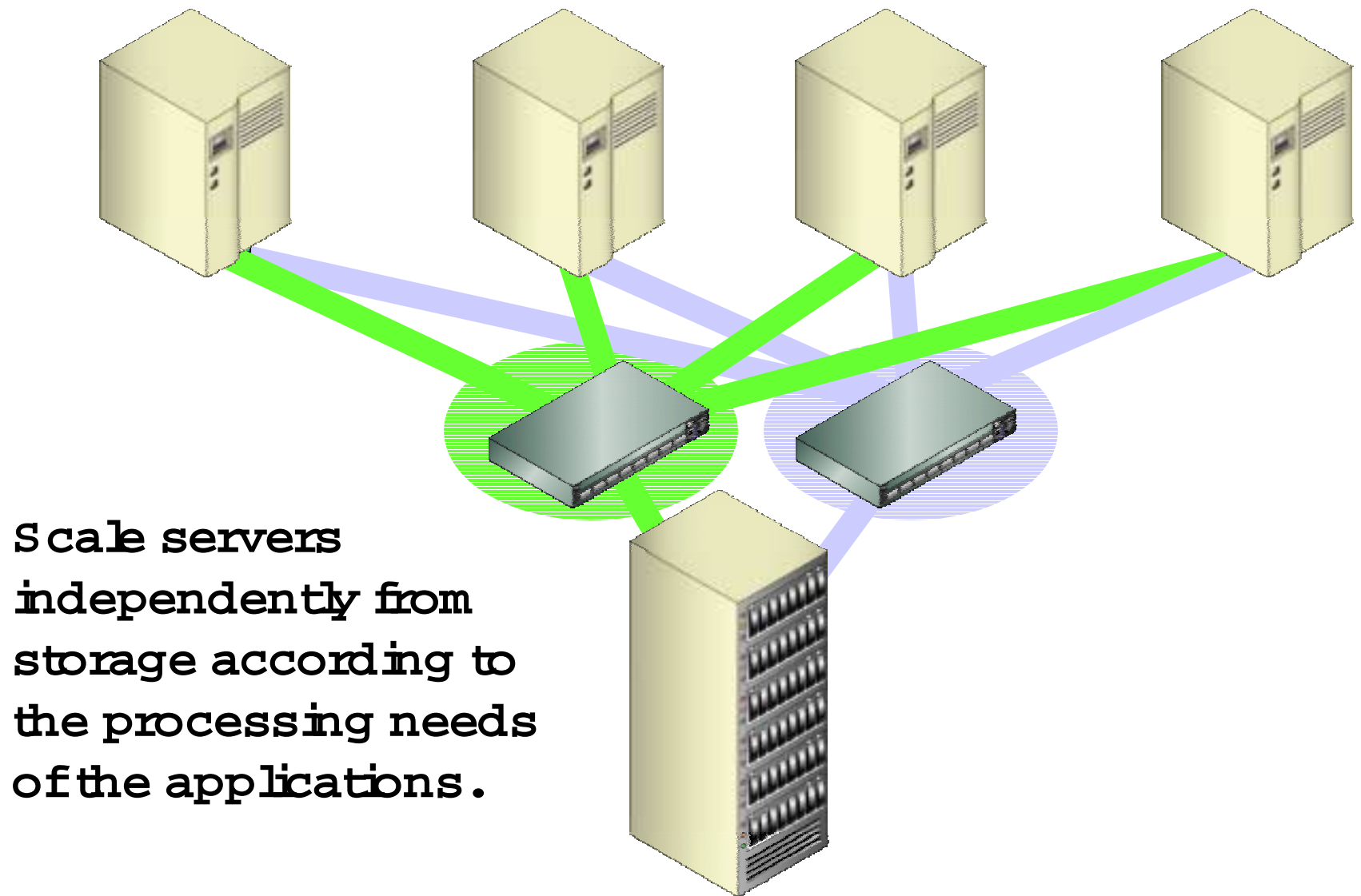**GX or GXS**

SCSI

Geminix

Storage

Step 1: Small Cluster

Start with two
servers connected
to a storage
system .

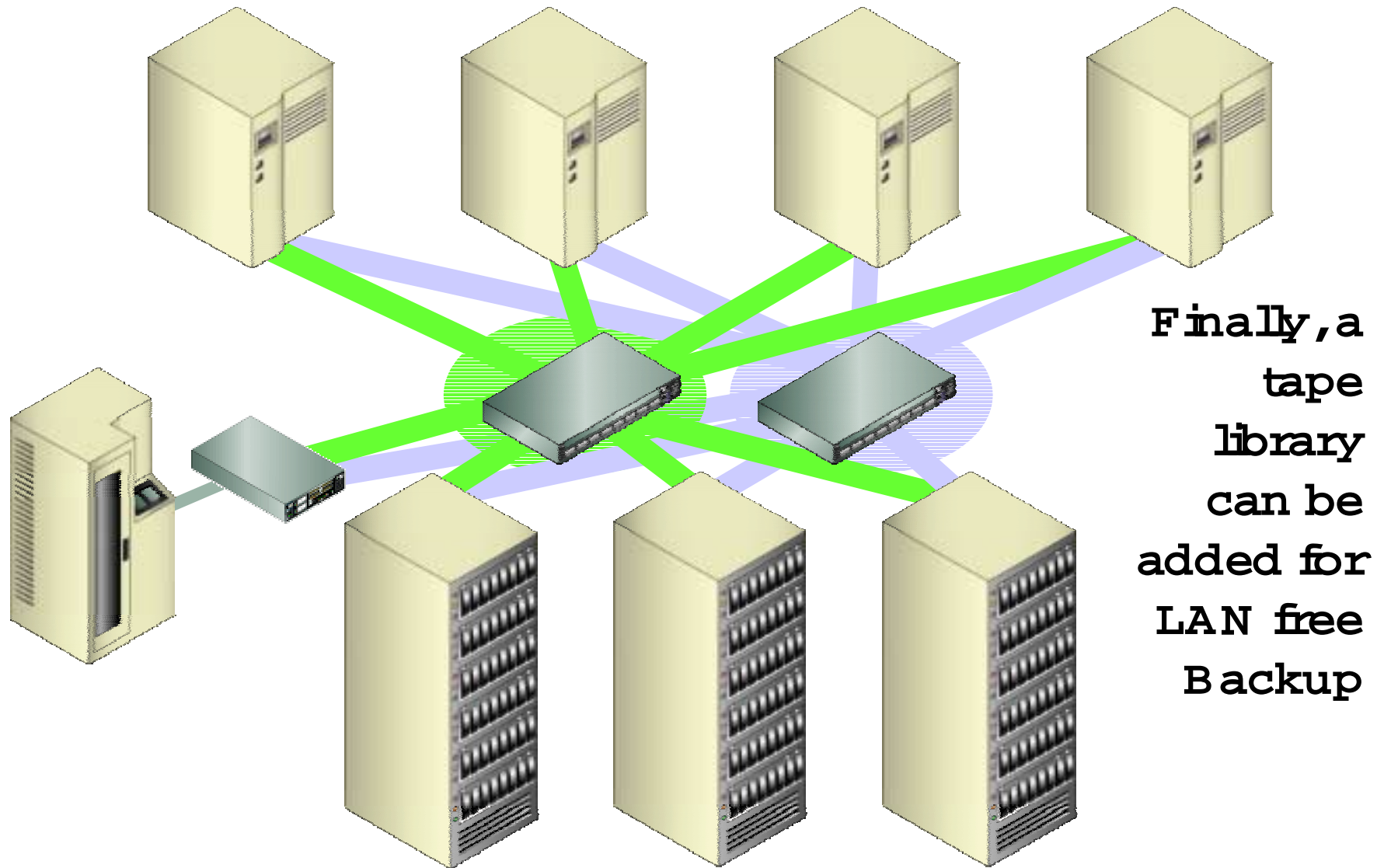For high availability
use two switches to
provide redundant
paths

Step 2: Scale the Servers

Scale servers independently from storage according to the processing needs of the applications.

Step 3: Scale the Storage

More
Storage
capacity
can easily
be added
without
server
downtime
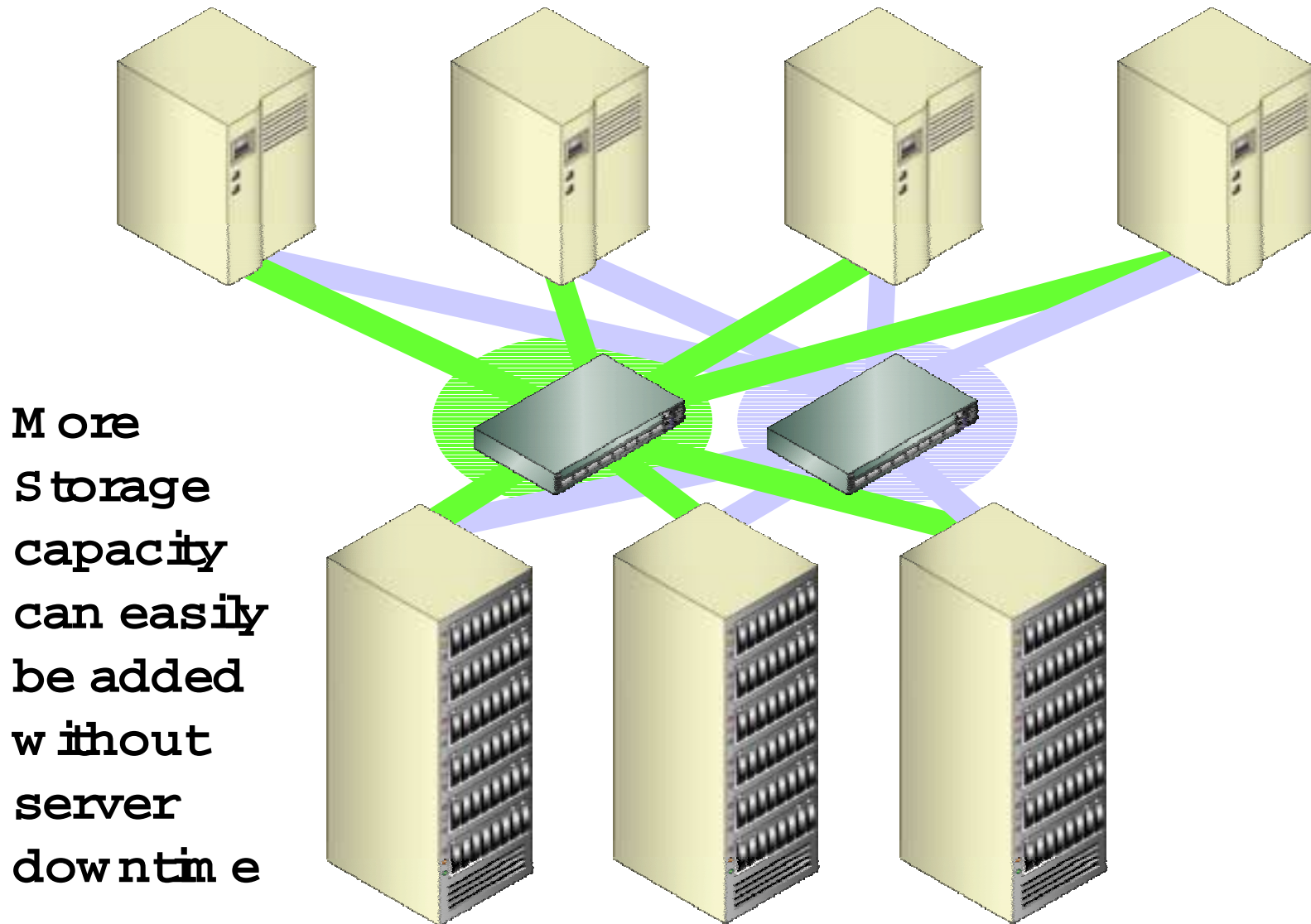
Step 4: Add Tape Backup

Finally, a tape library can be added for LAN free Backup